

What is claimed is:

1. An image copying device, comprising:

a reading portion that reads in an image formed on one surface of a document;

5 a storage portion that stores image data that is read in by the reading portion;

an image forming portion that forms an image on a recording medium based on the image data stored in the storage portion;

10 a reading control portion that provides control such that, when a plurality of documents having images formed on both sides thereof are to be read by the reading portion, images formed on one surfaces of the documents are read in sequentially and are stored sequentially in the storage  
15 portion, and then, after the reading in of the one surfaces of the documents is completed, images on the other surfaces of the documents are read in sequentially and are stored sequentially in the storage portion; and

image forming control portion that reads out, from the  
20 storage portion, image data for the one surfaces of the documents and the corresponding image data of the other surfaces of the documents, that controls the image forming portion to form images sequentially on the recording medium based on the image data, and that causes the start of the

forming of images on the recording medium by the image forming portion before the reading in of all of the other surfaces of the documents by the reading portion has been completed.

5           2. The image copying device as claimed in claim 1, wherein the image forming control portion sets, into a pair of image data, image data for one surface of each document and image data for the other surface of the subject document, which is stored in the storage portion, and forms  
10 an image based on the image data for the one surface of the document on one surface of a recording medium and an image based on the image data for the other surface of the subject document on another surface of the recording medium.

          3. The image copying device as claimed in claim 1,  
15 wherein the image forming control portion performs control in such a manner that, after the images on the one surfaces of all the documents has been read in by the reading portion, the reading of the other surfaces and the forming of images onto the recording medium by the image forming  
20 portion are executed in parallel with each other.

          4. The image copying device as claimed in claim 1, wherein the image forming control portion performs control in such a manner that the forming of images onto the recording medium by the image forming portion is started

after the reading of the other surfaces of the documents has started and when image data for the other surface of at least one document has been stored in the storage portion.

5        5.    The image copying device as claimed in claim 1,  
wherein the image forming control portion determines an  
estimated value of the time required until the reading in  
of the other surfaces of all of the documents by the  
reading portion has ended and an estimated value of the  
time required until image forming based on image data for  
10 both surfaces of all of the documents by the image forming  
portion has ended, and offsets, based on the estimated  
values, the start time of image forming by the image  
forming portion with respect to the start time of the  
reading of the other surfaces of the documents by the  
15 reading portion in such a manner that the end time of the  
reading of the other surfaces of all of the documents is  
earlier than the end time of image forming based on the  
image data for all of the documents.

20        6.    The image copying device as claimed in claim 1,  
wherein image forming based on image data for the other  
surface of a document by the image forming portion is  
performed before image forming based on the one surface of  
the subject document; and

the image forming control portion determines an

estimated value of the time required until the reading in  
of the other surface of the document by the reading portion  
has ended and an estimated value of the time required until  
the image forming based on image data for the other surface  
5 of the document has ended, and offsets, based on the  
estimated values, the start time of image forming of the  
other surface of the document by the image forming portion  
with respect to the start time of the reading of the other  
surface of the subject document, in such a manner that the  
10 end time of the reading of the other surface of the  
document is earlier than the end time of image forming  
based on the image data of the other surface of the  
document.

7. The image copying device as claimed in claim 1,  
15 wherein image forming based on image data for the one  
surface of a document by the image forming portion is  
performed before image forming based on the other surface  
of the subject document; and

the image forming control portion determines an  
20 estimated value of the time required until the reading in  
of the other surface of the document by the reading portion  
has ended and an estimated value of the time required until  
the image forming based on image data for both surfaces of  
the document has ended, and offsets, based on the estimated

values, the start time of image forming for the one surface of the document by the image forming portion with respect to the start time of the reading of the both surfaces of the document, in such a manner that the end time of the reading of the other surface of the document is earlier  
5 than the end time of image forming based on the image data of both surfaces of the document.

8. The image copying device as claimed in claim 1, wherein: the reading in of the other surface of a document  
10 and the image forming based on the image data for the other surface of the document are performed in parallel; and

the image forming control portion temporally stops the operation of the image forming portion when an amount of image data for the other surface of the document that is to  
15 be formed by the image forming portion and that is stored in the storage portion is smaller than a reference value before the reading in of the other surface of the document by the reading portion has completed.

9. The image copying device as claimed in claim 1, wherein: the reading in of the other surface of a document  
20 and the image forming based on the image data for the other surface of the document are performed in parallel; and

the reading control portion controls the operation of the reading portion in such a manner that the reading in of

the other surface of a document next to the subject document starts after the image forming of the other surface of the subject document by the image forming portion has ended.

5           10. The image copying device as claimed in claim 1, wherein:

          the one surfaces of the documents are sequentially read in by the reading portion in an order in which the documents are arranged and data for the one surfaces of all  
10   the documents is stored in the storage portion, and the other surfaces of the documents are sequentially read in by the reading portion in another order opposite to the order in which the documents are arranged and data for the other surfaces is stored in the storage portion; and

15           the image forming control portion performs control in such a manner that image data for the one surfaces of the documents that is stored in the storage portion and image data for the other surfaces of the documents that is stored in the storage portion is read out alternately in page  
20   units and images are formed by the image forming portion, and in such a manner that image data for the one surfaces is read out in an order opposite to the order in which the image data for the documents have been read in by the reading portion so that the one surface for one document is

read out before the one surface of another document that has been read in before the one surface for the subject document.

11. The image copying device as claimed in claim 1,  
5 wherein:

the one surfaces of the documents are sequentially read in by the reading portion in an order opposite to an order in which the documents are arranged and data for the one surfaces of all the documents is stored in the storage  
10 portion, and the other surfaces of the documents are sequentially read in by the reading portion in the order the same as the order in which the documents are arranged and data for the other surfaces is stored in the storage portion; and

15 the image forming control portion performs control in such a manner that image data for the one surfaces of the documents that is stored in the storage portion and image data for the other surfaces of the documents that is stored in the storage portion is read out alternately in page  
20 units and images are formed by the image forming portion, and in such a manner that image data for the other surfaces is read out in an order opposite to the order in which the image data for the documents have been read in by the reading portion so that the other surface for one document

is read out before the other surface of another document that has been read in before the one surface for the subject document.

5        12. The image copying device as claimed in claim 1, wherein the image data stored in the storage portion is deleted after the image forming for the image data has been completed by the image forming portion.

13. The image copying device as claimed in claim 1, wherein the storage portion is provided with:

10        a first storage area that stores image data for one surfaces of the documents; and

a second storage area that stores image data for the other surfaces of the documents, the first and second storage areas being independent from each other,

15        wherein image data for the other surface of one document that has been newly read in by the reading portion is stored in the second storage area by being overwritten onto image data which has been already stored in the second storage area and for which image forming by the image  
20        forming portion has ended.

14. The image copying device as claimed in claim 13, wherein the image data is stored in the second storage area in the unit of one page, and image data for the other surface of one document that has been stored in the second



storage area is overwritten by image data for the other surface of a next document that is read in by the reading portion next to the subject document.

5        15. The image copying device as claimed in claim 14, wherein image data for the other surface of each document is prohibited from being stored in the first storage area and image data for the one surface of each document is prohibited from being stored in the second storage area.

10       16 The image copying device as claimed in claim 13 wherein the second storage area is set to have a capacity for storing image data that is less than that of the first storage area.

15       17 The image copying device as claimed in claim 13, further comprising: a verification portion that checks, upon receipt of a copy instruction, available capacities of the first storage area and the second storage area,

      wherein the reading by the reading portion is prohibited when the available capacity of the first storage area is less than a predetermined first amount or when the available capacity of the second storage area is less than a predetermined second amount.

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      18. The image copying device as claimed in claim 17, wherein the reading by the reading portion is started when the verification portion has checked that the available

capacity in each of the first storage area and the second storage area is larger than or equal to the capacity of image data to be read from at least one document.

19. The image copying device as claimed in claim 13,  
5 further comprising a compression portion that compresses the image data before the image data is stored in either one of the first storage area and the second storage area.

20. The image copying device as claimed in claim 1,  
wherein the image forming portion is provided with a  
10 double-sided print portion that is capable of forming images on both sides of a recording medium.

21. An image copying device, comprising:

a reading portion that reads in an image formed on one surface of a document;

15 a storage portion that stores image data that is read in by the reading portion;

an image forming portion that forms an image on a recording medium based on the image data stored in the storage portion; and

20 a controller that provides control such that, when a plurality of documents having images formed on both sides thereof are to be read by the reading portion, images formed on one surfaces of the documents are read in sequentially and are stored sequentially in the storage portion, and then,  
25 after the reading in of the one surfaces of the documents is

completed, images on the other surfaces of the documents are read in sequentially and are stored sequentially in the storage portion, and that reads out, from the storage portion, image data for the one surfaces of the documents  
5 and the corresponding image data of the other surfaces of the documents, that controls the image forming portion to form images sequentially on the recording medium based on the image data, and that causes the start of the forming of images on the recording medium by the image forming portion  
10 before the reading in of all of the other surfaces of the documents by the reading portion has been completed.